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(54) ENHANCED AUTOMOTIVE PASSIVE ENTRY

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(57) **ABSTRACT**

Methods and devices are provided for allowing a mobile device (e.g., a key fob or a consumer electronic device, such as a mobile phone, watch, or other wearable device) to interact with a vehicle such that a location of the mobile device can be determined by the vehicle, thereby enabling certain functionality of the vehicle. A device may include both RF antenna(s) and magnetic antenna(s) for determining a location of a mobile device relative to the vehicle. Such a hybrid approach can provide various advantages. Existing magnetic coils on a mobile device (e.g., for charging or communication) may be re-used for distance measurements that are supplemented by the RF measurements. Any device antenna may provide measurements to a machine learning model that determines a region in which the mobile device resides, based on training measurements in the regions.

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